

HUMAN REPRODUCTION II

31 JULY 2013

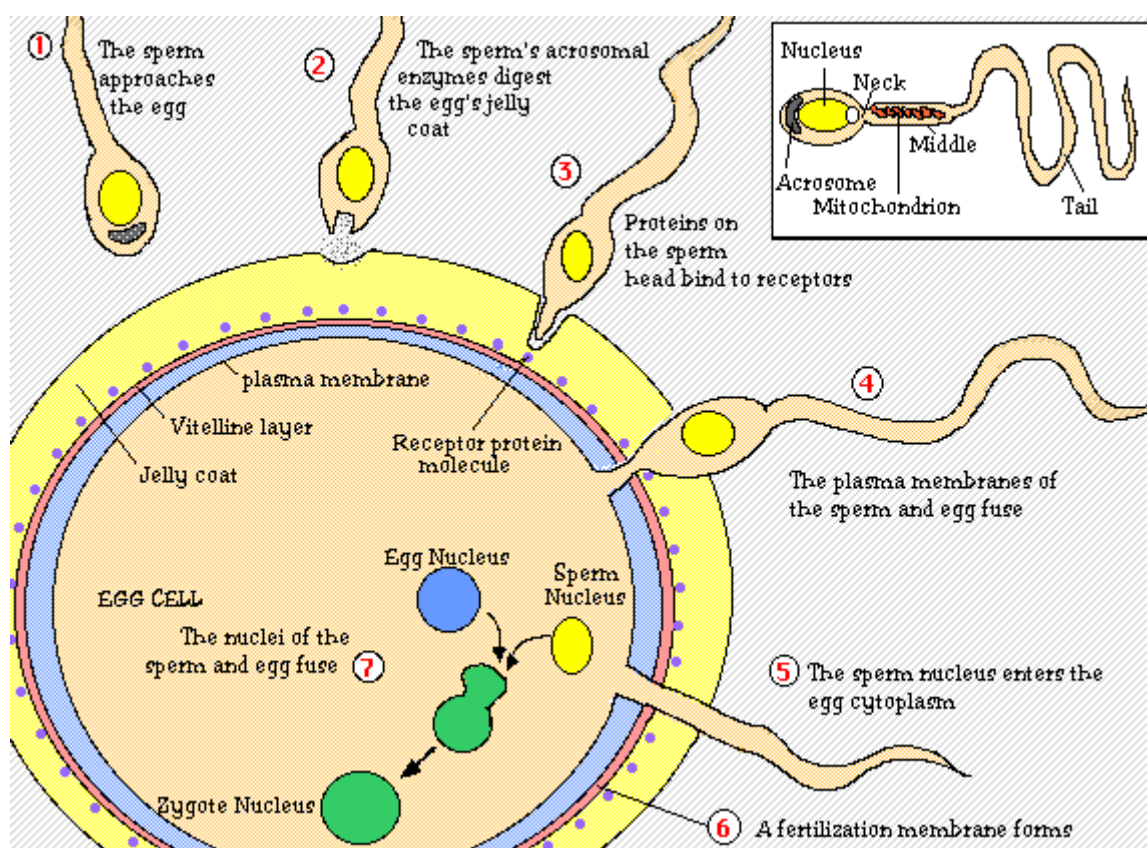
Lesson Description

In this lesson, we:

- Look at human reproduction in terms of:
 - Fertilisation
 - Development of the Embryo
 - Birth

Key Concepts

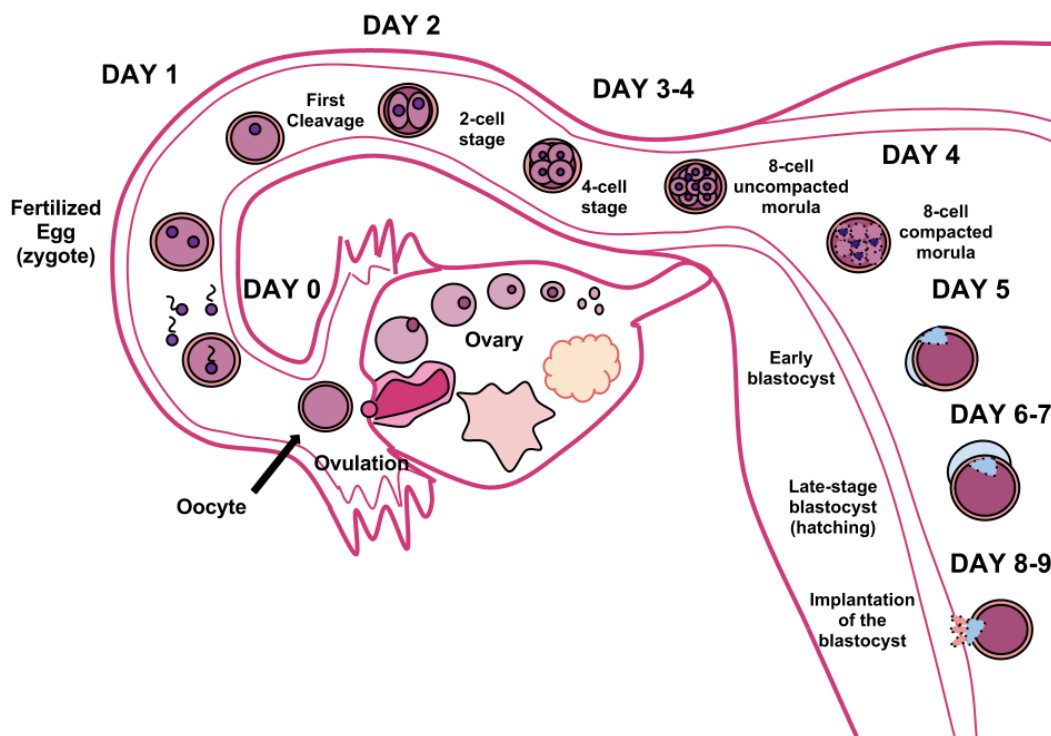
Fertilisation



(<http://www.bio.davidson.edu/Courses/Molbio/MolStudents/spring2005/Champaloux/fourth.html>)

- Humans reproduce by internal fertilization.
- Sperm cells are inserted into the vagina of the female by a process called copulation.
- The males parasympathetic nerve system must first be stimulated for the penis to become erect.
- The penis becomes erect by vasodilation of the arterioles in the penis. This increases the volume of blood.
- The erect penial tissue causes the valve of the urethra to close
- The rhythmic movement of copulation causes the smooth muscles of the epididymis, vas deferens, seminal vesicles, Cowper's gland and prostate to respond by contracting.
- These wave-like contractions cause ejaculation of the semen into the vagina.
- Semen is alkaline to increase the normally vaginal acidity to a pH of 6.

- Sperm is deposited up the vagina, close to the cervix
- The sperm swim via the cilia and travel to the uterus and into the fallopian tubes.
- Sperm survive in the fallopian tubes for up to 3 days

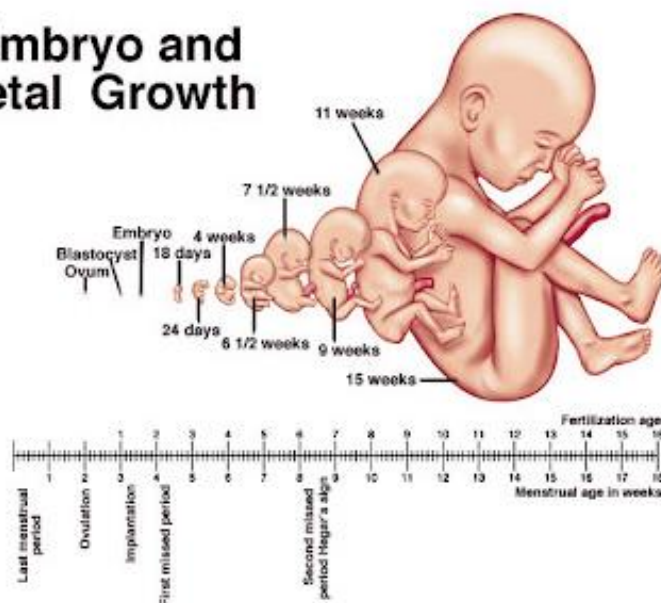


(https://commons.wikimedia.org/wiki/File:Human_Fertilization.png)

- Fertilization takes place inside the fallopian tube.
- The zygote is pushed towards the uterus by muscle contractions
- The process takes about 3 days.
- The zygote undergoes mitosis and divides to form a solid ball called the morula.
- After 6 days, the morula develops into a blastula and attaches to the lining of the uterus. This is called implantation and the female is now classified as pregnant.
- The outer layer of the blastula is called the trophoblast, which develops into the chorion.
- The chorion has finger-like outgrowths, which grow into the endometrium. This anchors the developing embryo and increases the surface area for the absorption of nutrients
- When fertilization takes place, the result is a diploid zygote.
- The zygote is a combination of the hereditary characteristics of both the male and the female.
- The zygote forms an embryo and finally a foetus.
- The female gives birth to ensure survival and continuation of the species.

Development of the Embryo

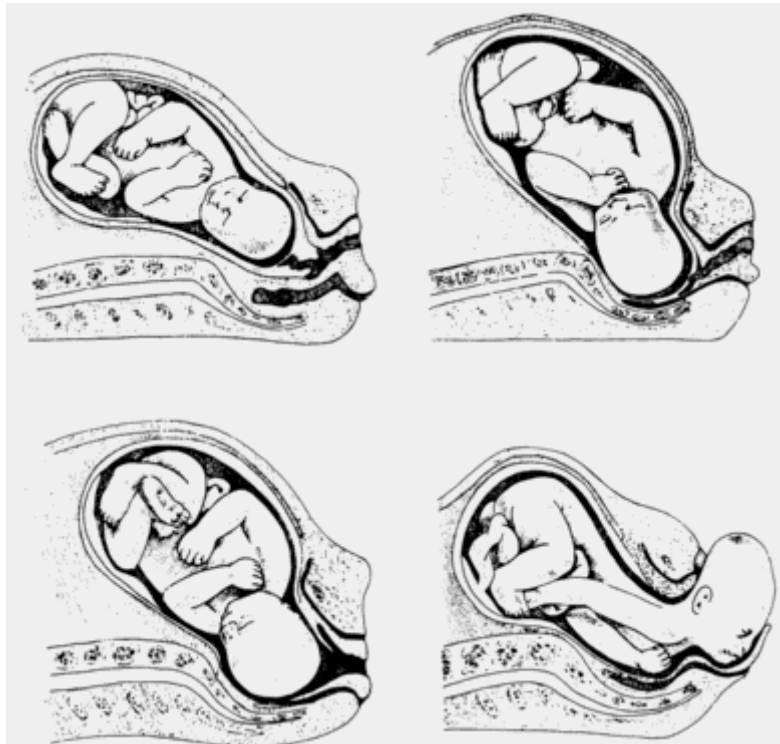
Embryo and Fetal Growth



(<http://jokes-view.blogspot.com/2012/09/video-stages-of-fetal-development-in.html>)

- The placenta forms a link between the mother and the developing foetus
- This means there is no direct transfer of the mother's blood to the developing foetus.
- The placenta develops about 12 weeks after conception and allows for the safe exchange of a number of substances:
 - Nutrients, oxygen, hormones and antibodies from mother to foetus
 - Carbon dioxide and wastes from the foetus to the mother for excretion by the mother
 - Harmful substances like nicotine from cigarette smoking, alcohol, drugs and viruses like rubella, hepatitis B and HIV can also move through the placenta
- The amnion is a membranous structure. It develops around the growing embryo.
- It is filled with amniotic fluid which protects the embryo by:
 - Acting as a shock absorber and regulating and keeping the embryo's body temperature constant.
- When labour starts and the uterus contracts. The pressure of the contractions causes the amnion to burst, releasing the amniotic fluid. This is called the 'water breaking'.

Birth

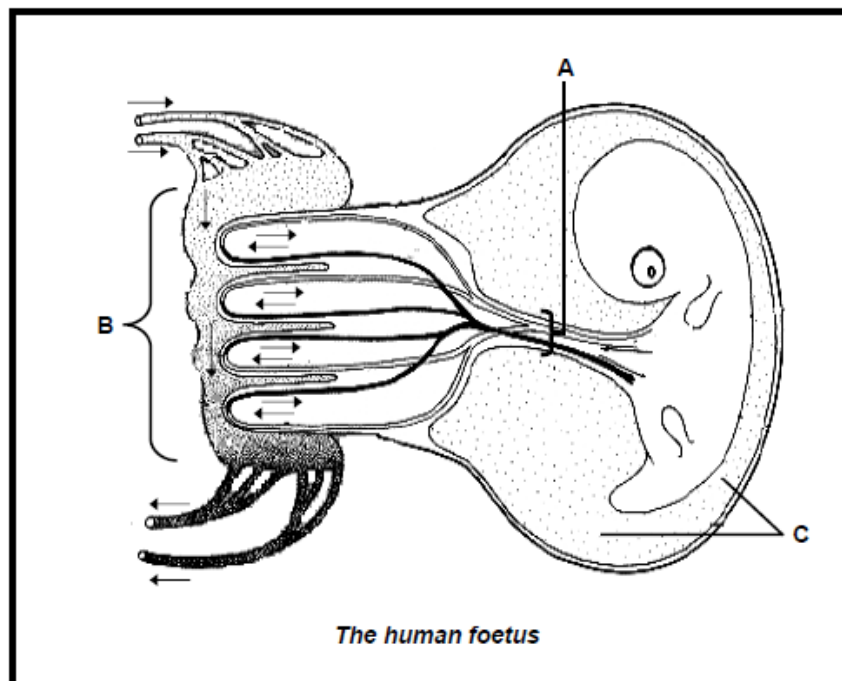


(<http://hes.ucfsd.org/gclaypo/repro/diagram/birth.html>)

Questions

Question 1

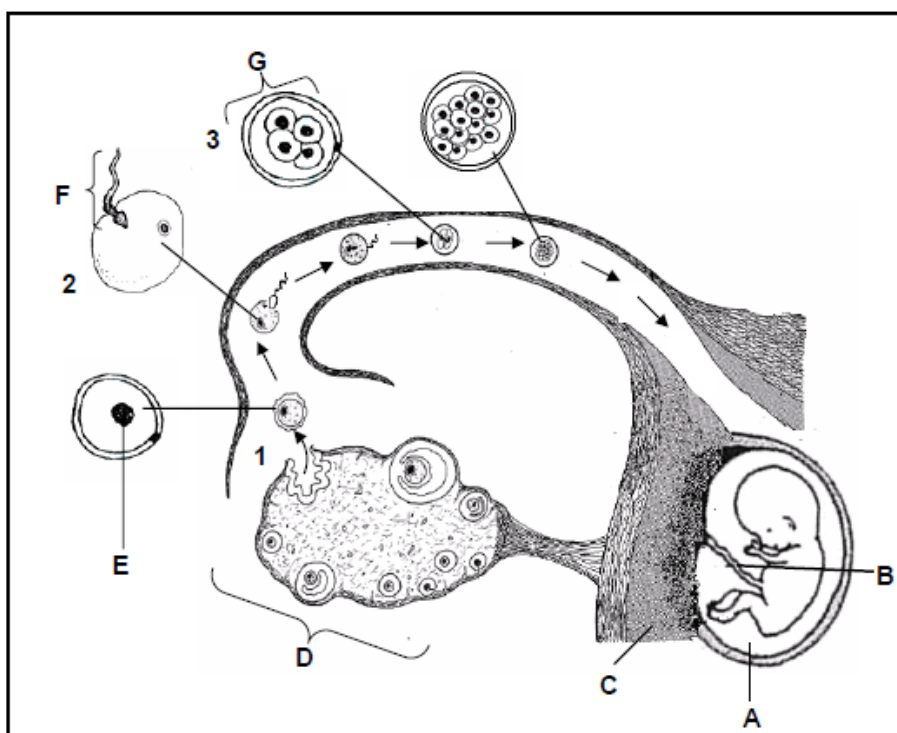
Study the graph below of a menstrual cycle and the influence of the different hormones on it.



- a.) Provide labels for A and B. (2)
- b.) Explain ONE way in which the part labelled B is structurally adapted for its function. (2)
- c.) Name TWO functions of the fluid found at C. (2)
- d.) Name the condition that might occur in the foetus if the mother consumes too much alcohol during the pregnancy. (1)
- e.) State what effect the condition named in QUESTION d.) would have on the child that is born. (1)

Question 2

The diagram below represents the events leading to the development of the foetus in the human uterus.



- a.) Label C and D. (2)
- b.) State which processes are taking place at 1, 2 and 3 respectively. (3)
- c.) State how many chromosomes are present in the following structures:
 - i. E (1)
 - ii. Each cell of structure G (1)
- d.) Draw an enlarged labelled diagram of structure F to show its details. (5)
- e.) State two functions of fluid A. (1)
- f.) Structure B transports substances to and from the foetus.
 - i. Name ONE useful substance transported to the foetus. (1)
 - ii. Name ONE waste product transported from the foetus. (1)